

COMPARATIVE BIOCHEMISTRY AND PHYSIOLOGY

An International Journal

EDITORS: P. W. HOCHACHKA and T. P. MOMMSEN

Volume Contents, Subject, and Author Index

Volume 124, Part A, 1999



COMPARATIVE BIOCHEMISTRY AND PHYSIOLOGY

EDITORS

Dr. P. W. Hochachka & Dr. T. P. Mommsen

CBP Editorial Office, University of British Columbia, 1153-2111 Lower Mall, Vancouver BC, Canada V6T 1Z4, Tel.: 604 827-4100; Fax: 604 827-4101

Managing Editor: Leslie Lightheart (Tel.: 604 827-4100; Fax: 604 827-4101).

REVIEW EDITOR

Dr P. J. Walsh

NIEHS Marine and Freshwater Biomedical Science Center, Rosenstiel School of Marine and Atmospheric Science, University of Miami, 4600 Rickenbacker Causeway, Miami, FL 33149-4617, U.S.A. Tel.: 305 361-4617; Fax: 305 361-4600

ASSOCIATE EDITORS

Dr D. J. van der Horst, Biochemical Physiology Research Group, Dept. of Experimental Zoology, Utrecht University, Padualaan 8, 3584 CH Utrecht, The Netherlands

Dr David R. Jones, Dept. of Zoology, University of British Columbia, 6270 University Boulevard, Vancouver BC, Canada V6T 1Z4

Dr Kiyooki Kuwasawa, Dept. of Biology, Tokyo Metropolitan University, Hachioji, Tokyo 192-03, Japan

Dr Mikko J. Nikinmaa, Dept. of Biology, University of Turku, FIN-20500 Turku, Finland

Prof. L. M. Riddiford, University of Washington, Department of Zoology, Box 351800, Seattle, WA 98185-1800, U.S.A.

Dr John J. Stegeman, Biology Department, Woods Hole Oceanographic Institute, Woods Hole, MA 02543, U.S.A.

Dr Yoshio Takei, Ocean Research Institute, University of Tokyo, Minami-dai, Nakano-ku, Tokyo 164, Japan

Prof. Michael C. Thorndyke, School of Biological Sciences, Royal Holloway College, University of London, Egham, Surrey TW20 0EX, U.K.

Dr A. Viarengo, Dipartimento di Scienze e Tecnologie Avanzate, Università del Piemonte Orientale, 15100 Alessandria, Italy

CBP EDITORIAL BOARD MEMBERS

Dr V. M. F. de Almeida e Val
Manaus, Brazil

Dr J. Baldwin
Clayton, Australia

Dr R. V. Baudinette
Bedford Park, Australia

Dr S. Bhattacharya
Santiniketan, India

Dr J. H. Brackenbury
Cambridge, U.K.

Dr P. J. Butler
Birmingham, U.K.

Dr A. R. Cossins
Liverpool, U.K.

Dr P. S. Davie
Palmerston North, New Zealand

Dr F. De Pablo
Madrid, Spain

Dr W. R. Ellington
Tallahassee, FL, U.S.A.

Dr E. Fabbri
Ferrara, Italy

Dr G. Flik
Nijmegen, The Netherlands

Prof. L. Förlin
Göteborg, Sweden

Prof. R. Fujii
Chiba, Japan

Prof. G. Gäde
Rondebosch, South Africa

Dr R. P. Henry
Auburn, AL, U.S.A.

Dr J. W. Hicks
Irvine, CA, U.S.A.

Prof. M. Kobayashi
Hiroshima, Japan

Dr M. Krauskopf
Santiago, Chile

Dr D. T. Manahan
Los Angeles, CA, U.S.A.

Dr A. Meyer
Konstanz, Germany

Dr S. Morris
Sydney, Australia

Prof. T. Motokawa
Tokyo, Japan

Dr Yu V. Natochin
St. Petersburg, Russia

Dr A. Péqueux
Liège, Belgium

Dr S. K. Pierce, Jr
College Park, MD, U.S.A.

Dr J. C. Rankin
Odense, Denmark

Dr K. L. Shephard
Birmingham, U.K.

Dr N. B. Terwilliger
Charleston, OR, U.S.A.

Prof. F. Tokunaga
Osaka, Japan

Dr J.-P. Truchot
Talence, France

Dr G. van den Thillart
Leiden, The Netherlands

Prof. M. Ugrumov
Moscow, Russia

Dr C. M. Wood
Hamilton, Canada

Dr P. A. Wright
Guelph, Canada

Prof. T. Yamaguchi
Okayama, Japan

Prof. T. Yoshizawa
Osaka, Japan

Periodicals Postage Paid at New York, NY and additional mailing offices. Postmaster send address corrections to Comparative Biochemistry and Physiology Part A, c/o Elsevier Science Inc., 655 Avenue of the Americas, New York, NY 10010-5107, USA.

Copyright © 1999 Elsevier Science Inc.



European Society for
Comparative Physiology & Biochemistry



Japanese Society for
Comparative Physiology & Biochemistry



The Society for
Integrative and Comparative Biology
(formerly The American Society of Zoologists)



Australian & New Zealand Society for
Comparative Physiology & Biochemistry



Canadian Society for Zoology
Comparative Physiology & Biochemistry Section



South American Society for Comparative
Physiology and Biochemistry



RUSSIAN
PHYSIOLOGICAL
SOCIETY



Chinese Association for
Physiological Sciences

SEB

THE SOCIETY FOR EXPERIMENTAL BIOLOGY



CONTENTS OF VOLUME 124

Vol. 124A, No. 1

Reviews

- P. W. Hochachka, J. L. Rupert and C. Monge 1 Adaptation and conservation of physiological systems in the evolution of human hypoxia tolerance
- J. Astrup 19 Ultrasound detection in fish—a parallel to the sonar-mediated detection of bats by ultrasound-sensitive insects?

General Papers

- K. H. Erlwanger, M. A. Unmack, M. L. Grøndahl, E. Skadhauge and J. E. Thorbøll 29 Effect of age on vasoactive intestinal polypeptide-induced short-circuit current in porcine jejunum
- G. B. Postnikova, S. V. Tselikova, S. G. Kolaeva and N. G. Solomonov 35 Myoglobin content in skeletal muscles of hibernating ground squirrels rises in autumn and winter
- G. M. Butterstein and G. J. Mizejewski 39 Alpha-fetoprotein inhibits frog metamorphosis: implications for protein motif conservation
- T. Matsuura, H. Fujita, C. Seki, K. Kashikura and I. Kanno 47 Hemodynamics evoked by microelectrical direct stimulation in rat somatosensory cortex
- H. J. McMillan and K. E. Wynne-Edwards 53 Divergent reproductive endocrinology of the estrous cycle and pregnancy in dwarf hamsters (*Phodopus*)
- J. J. Aarseth, E. S. Nordøy and A. S. Blix 69 The effect of body fat on basal metabolic rate in adult harp seals (*Phoca groenlandica*)
- J.-C. Chen and W.-C. Chen 73 Temperature tolerance of *Halotis diversicolor supertexta* at different salinity and temperature levels
- Y. Ishikawa, K. Koga and T. Matsushima 81 Slowly developing potentiation in goldfish retino-tectal synapses is masked by prior stimulation; an in vitro study
- K. A. Hatch and D. Afik 89 Retention time of digesta in insectivorous lizards—a comparison of methods and species
- E. A. Trautwein, A. Siddiqui and K. C. Hayes 93 Characterization of the bile acid profile in developing male and female hamsters in response to dietary cholesterol challenge

Instructions to Authors

Vol. 124A, No. 2

General Papers

- M. D. Ahern and S. Morris 105 Respiratory, acid-base and metabolic responses of the freshwater crayfish *Cherax destructor* to lead contamination
- W. A. Partata, A. M. R. Krepsky, L. L. Xavier, M. Marques and M. Achaval 113 Distribution of glycogen phosphorylase and cytochrome oxidase in the central nervous system of the turtle *Trachemys dorbigni*
- D. R. Bremner, S. J. Bertics and R. R. Grummer 123 Differences in activity of hepatic microsomal triglyceride transfer protein among species
- L. M. Lewin, R. Golan, P. Freidlin and L. Shochat 133 A comparative study of spermatozoal chromatin using acridine orange staining and flow cytometry
- W. W. Brooks and C. H. Conrad 139 Differences between mouse and rat myocardial contractile responsiveness to calcium
- G. M. O. Maloiy and E. T. Clemens 149 Digestive efficiency in two small, wild ruminants: the dik-dik and suni antelopes
- S. Harpaz and Z. Uni 155 Activity of intestinal mucosal brush border membrane enzymes in relation to the feeding habits of three aquaculture fish species

K. P. Choe, S. Edwards, A. I. Morrison-Shetlar, T. Toop and J. B. Claiborne	161	Immunolocalization of Na^+/K^+ -ATPase in mitochondrion-rich cells of the atlantic hagfish (<i>Myxine glutinosa</i>) gill
A. N. Charney, R. A. Giannella and R. W. Egnor	169	Effect of short-chain fatty acids on cyclic 3',5'-guanosine monophosphate-mediated colonic secretion
H. O. Pörtner, I. Hardewig and L. S. Peck	179	Mitochondrial function and critical temperature in the Antarctic bivalve, <i>Laternula elliptica</i>
R. I. Kushak and H. S. Winter	191	Regulation of intestinal peptidases by nutrients in human fetuses and children
V. I. Peinado, J. F. Celdrán and J. Palomeque	199	Basic hematological values in some wild ruminants in captivity
X. Ji and F. Braña	205	The influence of thermal and hydric environments on embryonic use of energy and nutrients, and hatchling traits, in the wall lizards (<i>Podarcis muralis</i>)
M. J. Packard	215	Evaluation of a protocol for studying the chick chorioallantoic membrane in vitro
K. C. Bicego-Nahas and L. G. S. Branco	221	Seasonal changes in the cardiorespiratory responses to hypercarbia and temperature in the bullfrog, <i>Rana catesbeiana</i>
T. M. Curtis, M. H. Depledge and R. Williamson	231	Voltage-activated currents in cardiac myocytes of the blue mussel, <i>Mytilus edulis</i>
		Instructions to Authors

Vol. 124A, No. 3

Symposium Articles

M. S. Hedrick and R. D. Morales	243	Nitric oxide as a modulator of central respiratory rhythm in the isolated brainstem of the bullfrog (<i>Rana catesbeiana</i>)
W. K. Milsom, S. G. Reid, J. T. Meier and R. Kinkead	253	Central respiratory pattern generation in the bullfrog, <i>Rana catesbeiana</i>
K. Lukowiak and N. Syed	265	Learning, memory and a respiratory central pattern generator
M. J. Gdovin, C. S. Torgerson and J. E. Remmers	275	The fictively breathing tadpole brainstem preparation as a model for the development of respiratory pattern generation and central chemoreception

Review

J. B. Dacks and H. E. Kasinsky	287	Nuclear condensation in protozoan gametes and the evolution of anisogamy
--------------------------------	-----	--

General Papers

A. Schütt, T. H. Bullock and E. Başar	297	Odorant-induced low-frequency activities of the <i>Helix</i> pedal ganglion are odorant-specific and related to behavior
L. F. Marins and J. A. Levy	313	High genetic distance between marine bivalves of the genus <i>Mesodesma</i> inhabiting the Atlantic and Pacific coasts of South America
E. Harada, Y. Itoh, K. Sitizyo, T. Takeuchi, Y. Araki and H. Kitagawa	321	Characteristic transport of lactoferrin from the intestinal lumen into the bile via the blood in piglets
L. Gerwick, N. E. Demers and C. J. Bayne	329	Modulation of stress hormones in rainbow trout by means of anesthesia, sensory deprivation and receptor blockade
A. J. Tiiska and K. Y. H. Lagerspetz	335	Effects of thermal acclimation on nervous conduction and muscle contraction in the frog <i>Rana temporaria</i>
A. Van der Linden, M. Vanaudenhove, M. Verhoye, G. De Boeck and R. Blust	343	Osmoregulation of the common carp (<i>Cyprinus carpio</i>) when exposed to an osmotic challenge assessed in-vivo and non-invasively by diffusion- and T_2 -weighted magnetic resonance imaging
A. E. Muchlinski, R. Gramajo and C. Garcia	353	Pre-existing bacterial infections, not stress fever, influenced previous studies which labeled <i>Gerrhosaurus major</i> an afebrile lizard species
J. Overgaard, M. Busk, J. W. Hicks, F. B. Jensen and T. Wang	359	Respiratory consequences of feeding in the snake <i>Python molorus</i>

Instructions to Authors

Symposium Papers

- | | | |
|--|-----|---|
| H. Tazawa, W. W. Burggren and A. Ar | 367 | Introduction: on the significance of cardiac rhythms |
| H. B. Lillywhite, K. C. Zippel and A. P. Farrell | 369 | Resting and maximal heart rates in ectothermic vertebrates |
| W. K. Milsom, M. B. Zimmer and M. B. Harris | 383 | Regulation of cardiac rhythm in hibernating mammals |
| T. Wang, M. S. Hedrick, Y. M. Ihmied and E. W. Taylor | 393 | Control and interaction of the cardiovascular and respiratory systems in anuran amphibians |
| B. Pelster | 407 | Environmental influences on the development of the cardiac system in fish and amphibians |
| P.-C. L. Hou and S.-P. Huang | 413 | Metabolic and ventilatory responses to hypoxia in two altitudinal populations of the toad, <i>Bufo bankorensis</i> |
| W. Burggren | 423 | Genetic, environmental and maternal influences on embryonic cardiac rhythms |
| M. Nichelmann, J. Höchel and B. Tzschentke | 429 | Biological rhythms in birds — development, insights and perspectives |
| R. Schaub and R. Prinzinger | 439 | Long-term telemetry of heart rates and energy metabolic rate during the diurnal cycle in normothermic and torpid African blue-naped mousebirds (<i>Urocolius macrourus</i>) |
| J. Altimiras | 447 | Understanding autonomic sympathovagal balance from short-term heart rate variations. Are we analyzing noise? |
| K. Moriya, J. Höchel, J. T. Pearson and H. Tazawa | 461 | Cardiac rhythms in developing chicks |
| R. Akiyama, T. Nagashima and H. Tazawa | 469 | Dynamical systems analysis of arterial blood pressure signals in relation to heart rate fluctuations in chick embryos |
| J. T. Pearson and H. Tazawa | 475 | Development of cardiac rhythms in altricial avian embryos |
| R. Akiyama, A. Matsuhisa, J. T. Pearson and H. Tazawa | 483 | Long-term measurement of heart rate in chicken eggs |
| A. Ar and H. Tazawa | 491 | Analysis of heart rate in developing bird embryos: effects of developmental mode and mass |
| J. Höchel, E. Mohr, M. Nichelmann, R. Pirow and H. Tazawa | 501 | Development of heart rate rhythmicity in Muscovy duck embryos |
| H. Tazawa, H. Mitsubayashi, M. Hirata, J. Höchel and J. T. Pearson | 511 | Cardiac rhythms in chick embryos during hatching |
| M. R. Enstipp, R. D. Andrews and D. R. Jones | 523 | Cardiac responses to first ever submergence in double-crested cormorant chicks (<i>Phalacrocorax auritus</i>) |
| J. L. Wilkens | 531 | The control of cardiac rhythmicity and of blood distribution in crustaceans |
| B. R. McMahon | 539 | Intrinsic and extrinsic influences on cardiac rhythms in crustaceans |
| H. Ando, T. Yazawa and K. Kuwasawa | 549 | Cardioacceleratory reflexes triggered by mechanoproprioceptors of the swimmerets in the stomatopod crustacean <i>Squilla oratoria</i> |
| T. Kuramoto | 553 | Cold-resistant changes in heartbeat of the Japanese spiny lobster |
| S. Matsumura, M. Kurokawa, K. Kuwasawa, R. B. Hill and K. Ohsuga | 561 | Serotonergic control of the heart and pericardium in the chiton <i>Acanthopleura japonica</i> |
| S. L. Harper and C. Reiber | 569 | Influence of hypoxia on cardiac functions in the grass shrimp (<i>Palaemonetes pugio</i> Holthuis) |
| A. Sakurai, A. Mori and H. Yamagishi | 575 | Acceleratory nervous regulation of juvenile myogenic hearts in the isopod crustacean <i>Ligia exotica</i> |
| K. Kuwasawa, H. Ai and T. Matsushita | 581 | Cardiac reflexes and their neural pathways in lepidopterous insects |

H. Mori

587 Onset of heartbeat revealed by successive structural changes in the developing single embryonic heart of the waterstrider (*Gerris paludum insularis*)

K. Tanaka, Y. F.-Tsukamoto and K. Kuwasawa

591 Central neuronal pathways of the cardioinhibitory reflex in the isopod crustacean *Bathynomus doederleini*

I Volume Contents, Subject and Author Index for Vol. 124A

Instructions to Authors